

### Surveillance of Vector Mosquitoes from the Aircraft Cabins at Taiwan Taoyuan International Airport, 2005–2013

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#### Abstract

Accidental transport of mosquitoes in aircraft and their associated risks have long been recognized. We captured the mosquitoes in the cabins of passenger aircrafts from overseas immediately after landing at Taiwan Taoyuan International Airport, at least one aircraft a day randomly during 2005 to 2013. Mosquitoes captured in 226 aircrafts were species of *Aedes (Stegomyia) aegypti* (n = 2) and *Culex (Culex) quinquefasciatus* (n = 473), none carried flaviviruses and alphaviruses (n = 196). After aircraft spray, from India for example, we found the number of mosquitoes were decreased significantly. Although none of the mosquitoes carried flaviviruses and alphaviruses, the captured species were known vectors of several human and veterinary exotic diseases (e.g., dengue fever, Japanese encephalitis, chikungunya, malaria, West Nile fever *et al.*) and might import potentially invasive mosquito species into Taiwan. Therefore, to avoid the occurrence of vector-borne disease in Taiwan, the most important ways are adequate disinsection strategies, surveillance and completely clean the habitat of mosquitoes.

**Keywords:** Vector-borne disease, Dengue fever, Japanese encephalitis, Chikungunya, Aircraft spray, Aircraft disinsection.

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## Norovirus Outbreak in a Psychiatric Institution, New Taipei City, December 2015

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### Abstract

On December 28, 2015, the health department of New Taipei City was notified of a diarrhea outbreak in a psychiatric institution (total 653 residents and 306 staffs). During December 22–30, 2015, there were 33 diarrheal patients (attack rate 3.4%), including 32 residents and 1 healthcare giver who developed fever, vomiting, diarrhea or abdominal pain. Laboratory investigations indicated norovirus as the etiological agent. The outbreak took place across 6 buildings (11 ward-units), involving patients from acute psychiatric units, chronic psychiatric units, and nursing home residents. As the acute units were separated from the chronic, Taipei Regional Center of Taiwan Centers for Disease Control, together with New Taipei City Health Department, conducted an investigation on December 29. We found that a person with epidemiologic links to the two units was tested positive for norovirus. The patient was a resident of and had contact with index case in the chronic unit, and worked as a receptionist assisting patients in the acute units on using the toilet during routine occupational therapy time. The patient had poor hand-hygiene adherence during work, which might be associated with the transmission among different units. Because psychiatric patients were poorly compliant with washing hands after using toilets, 50 ppm chlorine-containing solutions were used for hand hygiene every two hours; however, not all residents had adequately clean their hands immediately after possible norovirus exposures. The experience of this investigation highlights the challenge and the importance of infection control in psychiatric institutions.

**Keywords:** Psychiatric institutions, Diarrhea, Outbreak, Norovirus, Hand hygiene

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## Numbers of New Cases and Cumulative Cases of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis week		Week 41		Week 1–41	
Classification	Disease Diagnosed <sup>1</sup>	2016	2015	2016	2015
<b>Category I</b>	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
<b>Category II</b>	Acute Flaccid Paralysis	0	0	32	13
	Acute Viral Hepatitis type A	21	6	893	106
	Amoebiasis	9	0	252	295
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	8	4
	Cholera	0	0	10	8
	Dengue Fever	6	2290	724	25493
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	3	2
	Malaria	1	0	11	8
	Measles	0	1	13	29
	Meningococcal Meningitis	0	0	5	2
	Paratyphoid Fever	0	0	5	4
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
Shigellosis	8	4	168	147	
Typhoid fever	0	1	4	24	
West Nile Fever	0	0	0	0	
<b>Category III</b>	Acute Viral Hepatitis type B	8	0	87	99
	Acute Viral Hepatitis type C <sup>5</sup>	1	3	165	169
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	0	0	14	2
	Acute Viral Hepatitis untype	0	0	0	1
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	0	1	23	5
	Haemophilus Influenza type b Infection	0	0	13	2
	Japanese Encephalitis	3	0	23	28
	Legionellosis	3	4	84	142
	Mumps <sup>2</sup>	11	15	478	623
	Neonatal Tetanus	0	0	0	0
	Pertussis	1	2	17	80
	Tetanus <sup>2</sup>	0	0	9	8
<b>Category IV</b>	Botulism	0	0	5	2
	Brucellosis	0	0	0	2
	Complicated Influenza	4	2	1883	804
	Complicated Varicella <sup>4</sup>	0	2	31	43
	Endemic Typhus Fever	0	1	13	29
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	8	5	461	415
	Leptospirosis	3	0	83	69
	Lyme Disease	0	0	2	2
	Melioidosis	6	1	33	31
	Q Fever	0	1	40	38
	Scrub Typhus	9	12	359	331
	Toxoplasmosis	0	0	8	9
Tularremia	0	0	0	0	
<b>Category V</b>	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections <sup>6</sup>	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
2. Reported cases.
3. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
4. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical and laboratory conditions" to "meet the clinical or laboratory conditions".
5. Since 2014/7/1, various subtypes of human cases of avian influenza are reported as "novel influenza A virus infections", a Category V Notifiable Infectious Disease. The original "H5N1 flu" and "H7N9 flu", which were respectively listed as a Category I Notifiable Infectious Disease and a Category V Notifiable Infectious Disease were removed from the list on the same day.
6. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

## Suspected Clusters

- Sixteen clusters were reported, including 10 diarrhea clusters, 3 tuberculosis clusters, 2 upper respiratory tract infection clusters, and 1 influenza-like illness cluster.

## Imported Infectious Diseases

- 21 confirmed cases were imported from 5 countries during Week 41 of 2016.

Disease \ Country	Country					Total
	Indonesia	Philippines	Thailand	Malaysia	China	
Dengue Fever	1	5		1		7
Shigellosis	5					5
Amoebiasis	3					3
Zika virus infection			2	1		3
Hepatitis B			1		1	2
Malaria	1					1
<b>Total</b>	10	5	3	2	1	21

Note: The statistics listed in this table include imported cases that were either confirmed or updated\* in the previous week.

- A total of 643 confirmed cases were imported from 37 countries in 2016.
- Top 3 imported diseases : Dengue fever (284), Amoebiasis (124), Hepatitis A (79).
- Top 3 countries responsible for most imported cases : Indonesia (267), Philippines (74), Thailand (61).

## Summary of Epidemic

- **Dengue Fever** : The epidemic has increased continuously in Southeast Asian countries. Imported cases have continued to be reported. The recent occurrence of rain has still promoted mosquito growths and elevated the risk of dengue transmission. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.
- **Zika Virus Infection** : The epidemic has continuously increased in Southeast Asian countries, elevating the risk of importing Zika virus from these countries. New cases imported from Southeast Asian countries have been confirmed.
- **Scrub Typhus** : The number of cases reported has continuously decreased and the

peak of the epidemic activity is expected to be over by the end of October.

- **Enterovirus** : The epidemic has continuously occurred in the community. Coxsackie A virus is currently the dominant strain circulating in the community. Sporadic cases of enterovirus 71 infection have been recently confirmed. This year, a total of 147 cases of enterovirus 71 infection, including 20 severe cases, 125 mild cases and 2 suspected severe cases, have been confirmed. The public is urged to enhance personal hygiene and stay vigilant for suspicious symptoms of enterovirus infection with severe complications in infants.

### Numbers of New Cases and Cumulative Cases of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis week		Week 42		Week 1—42	
Classification	Disease Diagnosed <sup>1</sup>	2016	2015	2016	2015
Category I	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
Category II	Acute Flaccid Paralysis	1	0	33	13
	Acute Viral Hepatitis type A	18	4	911	110
	Amoebiasis	6	5	258	300
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	8	4
	Cholera	0	2	10	10
	Dengue Fever	11	2091	735	27584
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	3	2
	Malaria	2	0	13	8
	Measles	0	0	13	29
	Meningococcal Meningitis	1	1	6	3
	Paratyphoid Fever	0	0	5	4
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
	Shigellosis	8	3	176	150
Typhoid fever	2	0	6	24	
West Nile Fever	0	0	0	0	
Category III	Acute Viral Hepatitis type B	0	4	87	103
	Acute Viral Hepatitis type C <sup>5</sup>	4	2	169	171
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	1	0	15	2
	Acute Viral Hepatitis untype	0	0	0	1
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	2	0	25	5
	Haemophilus Influenza type b Infection	1	0	14	2
	Japanese Encephalitis	0	1	23	29
	Legionellosis	2	4	86	146
	Mumps <sup>2</sup>	21	15	499	638
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	0	17	80
	Tetanus <sup>2</sup>	1	1	10	9
Category IV	Botulism	0	0	5	2
	Brucellosis	0	0	0	2
	Complicated Influenza	7	1	1890	805
	Complicated Varicella <sup>4</sup>	0	0	31	43
	Endemic Typhus Fever	0	1	13	30
	Herpesvirus B Infection	0	0	0	0
	Invasive Pneumococcal Disease	6	7	467	422
	Leptospirosis	11	5	94	74
	Lyme Disease	0	0	2	2
	Melioidosis	3	1	36	32
	Q Fever	0	1	40	39
	Scrub Typhus	22	19	381	350
	Toxoplasmosis	0	1	8	10
Tularremia	0	0	0	0	
Category V	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections <sup>6</sup>	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
	Yellow Fever	0	0	0	0

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
2. Reported cases.
3. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
4. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical **and** laboratory conditions" to "meet the clinical **or** laboratory conditions".
5. Since 2014/7/1, various subtypes of human cases of avian influenza are reported as "novel influenza A virus infections", a Category V Notifiable Infectious Disease. The original "H5N1 flu" and "H7N9 flu", which were respectively listed as a Category I Notifiable Infectious Disease and a Category V Notifiable Infectious Disease were removed from the list on the same day.
6. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

### Suspected Clusters

- Eleven clusters were reported, including 7 diarrhea clusters, 2 tuberculosis clusters, 1 upper respiratory tract infection cluster, and 1 varicella cluster.

### Imported Infectious Diseases

- 22 confirmed cases were imported from 7 countries during Week 42 of 2016.

Country Disease	Indonesia	Philippines	Myanmar	Vietnam	Thailand	China	Malaysia	Total
Dengue Fever	2	4	2	2	2		1	13
Amoebiasis	4							5
Shigellosis	2					1		3
Typhoid fever						1		1
<b>Total</b>	8	4	2	2	2	2	1	22

Note: The statistics listed in this table include imported cases that were either confirmed or updated\* in the previous week.

- A total of 654 confirmed cases were imported from 37 countries in 2016.
- Top 3 imported diseases : Dengue fever (297), Amoebiasis (128), Shigellosis (82).
- Top 3 countries responsible for most imported cases : Indonesia (275), Philippines (76), Thailand (63).

### Summary of Epidemic

- **Dengue Fever** : Although dengue activity has decreased in some countries in Southeast Asia, it has remained at its peak in Southeast Asia. Imported cases have continued to be reported. The recent occurrence of rain has become less frequent, but mosquito activity remains high. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.
- **Zika Virus Infection** : The epidemic has continuously increased in Southeast Asian countries, elevating the risk of importing Zika virus from these countries. New cases imported from Southeast Asian country have been confirmed.
- **Scrub Typhus** : The number of cases reported has continuously decreased. The endemic areas are primarily Penghu County, Kinmen County and Hualien County.

- **Enterovirus** : New cases have been recently reported in the western Taiwan. Coxsackie A virus is currently the dominant strain circulating in the community. Sporadic cases of enterovirus 71 infection have been recently confirmed. This year, a total of 149 cases of enterovirus 71 infection, including 21 severe cases and 128 mild cases, have been confirmed. The public is urged to enhance personal hygiene and stay vigilant for suspicious symptoms of enterovirus infection with severe complications in infants.
- **Influenza** : The numbers of severe and mild cases have increased slightly. H3N2 is currently the dominant strain circulating in the commu



## Numbers of New Cases and Cumulative Cases of Notifiable Infectious Diseases (by week of diagnosis)

Case diagnosis week		Week 43		Week 1—43	
Classification	Disease Diagnosed <sup>1</sup>	2016	2015	2016	2015
<b>Category I</b>	Plague	0	0	0	0
	Rabies	0	0	0	0
	SARS	0	0	0	0
	Smallpox	0	0	0	0
<b>Category II</b>	Acute Flaccid Paralysis	2	6	35	19
	Acute Viral Hepatitis type A	24	5	935	115
	Amoebiasis	7	6	265	306
	Anthrax	0	0	0	0
	Chikungunya Fever	0	0	8	4
	Cholera	0	0	10	10
	Dengue Fever	12	2142	747	29726
	Diphtheria	0	0	0	0
	Enterohemorrhagic E. coli Infection	0	0	0	0
	Epidemic Typhus Fever	0	0	0	0
	Hantavirus Pulmonary Syndrome	0	0	0	0
	Hemorrhagic Fever with Renal Syndrome	0	0	3	2
	Malaria	0	0	13	8
	Measles	0	0	13	29
	Meningococcal Meningitis	0	0	6	3
	Paratyphoid Fever	0	1	5	5
	Poliomyelitis	0	0	0	0
	Rubella	0	0	4	6
	Shigellosis	8	5	184	155
	Typhoid fever	1	0	7	24
West Nile Fever	0	0	0	0	
<b>Category III</b>	Acute Viral Hepatitis type B	2	1	89	104
	Acute Viral Hepatitis type C <sup>5</sup>	3	4	172	175
	Acute Viral Hepatitis type D	0	0	1	1
	Acute Viral Hepatitis type E	0	0	15	2
	Acute Viral Hepatitis untype	0	0	0	1
	Congenital Rubella Syndrome	0	0	0	0
	Enteroviruses Infection with Severe Complications	2	0	27	5
	Haemophilus Influenza type b Infection	0	0	14	2
	Japanese Encephalitis	0	0	23	29
	Legionellosis	5	2	91	148
	Mumps <sup>2</sup>	20	19	519	657
	Neonatal Tetanus	0	0	0	0
	Pertussis	0	2	17	82
	Tetanus <sup>2</sup>	0	0	10	9
	<b>Category IV</b>	Botulism	0	0	5
Brucellosis		0	0	0	2
Complicated Influenza		17	1	1907	806
Complicated Varicella <sup>4</sup>		4	2	35	45
Endemic Typhus Fever		0	0	13	30
Herpesvirus B Infection		0	0	0	0
Invasive Pneumococcal Disease		8	8	475	430
Leptospirosis		6	2	100	76
Lyme Disease		0	0	2	2
Melioidosis		1	1	37	33
Q Fever		1	1	41	40
Scrub Typhus		10	21	391	371
Toxoplasmosis		0	1	8	11
Tularremia		0	0	0	0
<b>Category V</b>	Ebola Virus Disease	0	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0	0
	Novel Influenza A Virus Infections <sup>6</sup>	0	0	0	0
	Lassa Fever	0	0	0	0
	Rift Valley Fever	0	0	0	0
	Middle East Respiratory Syndrome Coronavirus	0	0	0	0
Yellow Fever	0	0	0	0	

1. The following 8 chronic diseases are excluded from the table: MDR-TB, Tuberculosis, Syphilis, Gonorrhoea, HIV Infection, AIDS, Hansen Disease and Creutzfeldt-Jakob Disease.
2. Reported cases.
3. Since 2014/1/1, "Varicella" was modified to "Complicated Varicella".
4. Since 2014/3/6, the case definition for confirmed Acute hepatitis C was changed from "meet the clinical and laboratory conditions" to "meet the clinical or laboratory conditions".
5. Since 2014/7/1, various subtypes of human cases of avian influenza are reported as "novel influenza A virus infections", a Category V Notifiable Infectious Disease. The original "H5N1 flu" and "H7N9 flu", which were respectively listed as a Category I Notifiable Infectious Disease and a Category V Notifiable Infectious Disease were removed from the list on the same day.
6. Since 2016/1/22, "Zika Virus Infection" was listed as a Notifiable Infectious Disease.

## Suspected Clusters

- Nineteen clusters were reported, including 6 diarrhea clusters, 5 upper respiratory tract infection clusters, 5 influenza-like illness clusters, and 3 varicella clusters.

## Imported Infectious Diseases

- 18 confirmed cases were imported from 6 countries during Week 43 of 2016.

Country Disease	Indonesia	Philippines	Vietnam	Gambia	Sierra Leone	China	Total
Dengue Fever	3	3	3			1	10
Amoebiasis	3						3
Malaria				1	1		2
Shigellosis	2						2
Hepatitis A		1					1
<b>Total</b>	8	4	3	1	1	1	18

Note: The statistics listed in this table include imported cases that were either confirmed or updated\* in the previous week.

- A total of 672 confirmed cases were imported from 37 countries in 2016.
- Top 3 imported diseases : Dengue fever (307), Amoebiasis (131), Shigellosis (84).
- Top 3 countries responsible for most imported cases : Indonesia (283), Philippines (80), Thailand (63).

## Summary of Epidemic

- **Dengue Fever** : Although dengue activity has decreased in some countries in Southeast Asia, it has remained at its peak in Southeast Asia. Imported cases have continued to be reported. The recent occurrence of rain has become less frequent, but mosquito activity remains high. The public is urged to clean up and remove any vector breeding sites and take prevention measures against mosquito bites.
- **Zika Virus Infection** : The epidemic has continuously increased in Southeast Asian countries, elevating the risk of importing Zika virus into Taiwan from these countries. New cases imported from Southeast Asian country have been confirmed.
- **Scrub Typhus** : Sporadic cases have been confirmed, and the epidemic activity has slowed down gradually.

- **Enterovirus** : New cases have been recently reported in the community. Coxsackie A virus is currently the dominant strain circulating in the community. Sporadic cases of enterovirus 71 infection have been recently confirmed. This year, a total of 151 cases of enterovirus 71 infection, including 21 severe cases, 129 mild cases and 1 suspected severe cases, have been confirmed. The public is urged to enhance personal hygiene and stay vigilant for suspicious symptoms of enterovirus infection with severe complications in infants.
- **Influenza** : Due to the recent low temperature, influenza activity has increased. H3N2 is currently the dominant strain circulating in the community.

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